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bama, competition between oaks, and the forest resources of Georgia. The paper on Bald Knob (Plant World **9**:265–269. 1906) recounts an interesting occurrence of coastal plain plants on the xerophytic summit of a hill. Here there is strong evidence that this is a pioneer plant association, a fact which the author doubtless correctly thinks is in favor of the theory that the coastal pines represent a pioneer formation. The paper dealing with competition in oaks (Plant World **10**:114–116. 1907) recounts the crowding-out of specimens of *Quercus laurifolia* by *Q. Phellos*, when set out near together; the especial interest here comes from the fact that the former oak is a pioneer, and the latter a denizen of the climax forests of the region. The paper on the forest resources of Georgia (Southern Woodlands **1**:4–23. 1907) is the first of a series, and gives an account of the distributional factors involved, and the natural subdivisions of the forests of Georgia, accompanied by a map.—H. C. COWLES.

A tropical study in physiographic ecology.—WHITFORD'S paper[12] on Philippine vegetation is a record of the first attempt to test the principles of physiographic ecology in the tropics, and hence is of more than usual interest to ecologists who have worked only in the temperate zone. The area studied embraces the slopes of Mt. Mariveles, from the sea-level to an altitude of 1400 meters. The introduction includes remarks on the importance of determining the available water-content of the soil at all seasons, and some mention is made of the practical application of ecological study. The climate has well-marked wet and dry periods, and yet evergreens are as characteristic of the vegetation as are deciduous trees. The prevailing forest type is thus midway between SCHIMPER'S rain-forest and the monsoon forest. Possibly the retention of much water in the soil during the relatively short dry period is a factor in the matter.

The climax forest of the lowland is the Bambusa-Parkia forest, and it is WHITFORD'S belief that this is the general type to which other formations of the region are tending. An interesting feature here are the parangs, which are artificial formations, corresponding somewhat to our clearings. There are various types, but all seem to show evidence of gradual displacement by the culminating Bambusa-Parkia forest. A further similar evidence of this is the appearance of natural xerophytic patches resembling the parang within the Bambusa-Parkia forest. Next up the slope comes the Anisoptera-Strombosia formation, in which there is a dominance of the Dipterocarpaceae. Tables show the enormous number of tree species in these forests. Here, as in all of the formations, many details are given of the life-habits of the plants. The buttressed bases are associated with the overtowering trees of the highest forest stratum. Next come the Dipterocarpus-Shorea formation, in which 30 per cent. of the species are dipterocarps, and the Shorea-Plectronia formation. From the first to the last of the formations named above there has been a progressive increase in mesophytism, and in the dominance of the evergreen habit, correlated with a similar increase in rain and humidity. At the mountain top, however, there is a dwarf or "elfin" forest of Eugenia and Vaccinium; yet the humidity is greater here than anywhere below. In this "elfin" forest is found the greatest development of epiphytes, not alone mosses and lichens, but also liverworts, orchids, and even filmy ferns.

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[12] WHITFORD, H. N., The vegetation of the Lamao forest reserve. Philipp. Jour. Sci. **1**:373–431, 637–682. 1906.

The final sections deal with the strand formations, which have but a meager development in the region studied. The strand vegetation closely resembles that of the Javanese strand, described by SCHIMPER, and need not be reviewed fully. The chief formations are the Pes-Caprae and Barringtonia-Pandanus formations of sandy shores and the Mangrove-Nipa-Acanthus formation of muddy shores. The Bambusa-Parkia formation encroaches rapidly on these shore formations. It is suggested that in other portions of the Philippines the climax forest differs from the dominant Bambusa-Parkia forest of the region described. It is unnecessary to point out the great importance of this study. It might have been anticipated that the broad principles of succession are as applicable to tropical as to temperate regions, but it remained for WHITFORD to show this to be the case.—H. C. COWLES.

Ascocarp of Lachnea.—Miss FRASER[13] has recently discovered another case of supposed reduced fertilization similar to that described for *Humaria granulata* by BLACKMAN and FRASER. In *Lachnea stercorea*, a form in which a functionless antheridium and trichogyne are said to be present, she finds the archicarp arising, as described by WORONIN for *Lachnea scutellata*, from a lateral branch of the multinucleate cells of the mycelium. Five or more cells are formed, the terminal one of which becomes the ascogonium. This ascogonium, which is multinucleate, gives rise to a branch, into which pass several nuclei. When mature this branch, which is regarded as a trichogyne, contains five or six multinucleate cells, the terminal one becoming greatly enlarged and containing many nuclei. The position and degree of development of this trichogyne seems to vary greatly, developing as a terminal or lateral structure, which may or may not be entirely inclosed by the investing hyphae. Miss FRASER regards this trichogyne as intermediate in structure between that of Pyronema on the one hand, where a unicellular functioning organ is well developed, and Physcia or Collema on the other hand, where the trichogyne is multicellular and functioning. Although the position and origin of the antheridium does not appear to have been definitely worked out, the author believes it to arise from the cell next below the ascogonium, that it is a unicellular multinucleate structure, similar to that of Pyronema, and that it fuses with the terminal cell of the trichogyne. In some cases no trace of the trichogyne could be found, and it is believed that it fails to develop, as in Humaria. The nuclei of the antheridium often remain in the cell and degenerate *in situ* or pass into the terminal cell of the trichogyne. Fertilization by the fusion of male and female nuclei in the ascogonium does not occur, there-

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[13] FRASER, H. C. I., On the sexuality and development of the ascocarp in *Lachnea stercorea* Pers. Annals of Botany **21**:349–360. *pls. 29, 30.* 1907.